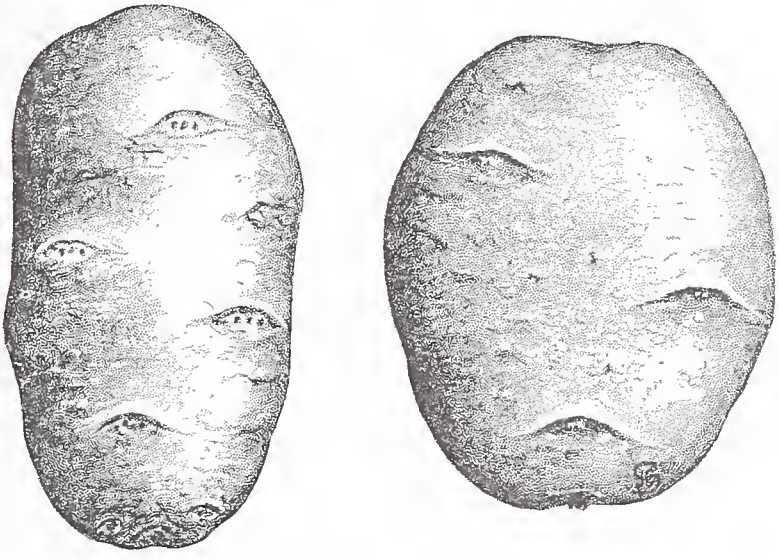
PENNSYLVANIA
DEPARTMENT OF AGRICULTURE
HARRISBURG, PA.

Vol. 3 APRIL, 1920 No. 8

General Bulletin No. 339
BUREAU OF PLANT INDUSTRY
Circular No. 2

THE SEED POTATO QUESTION

By W. A. McCubbin



GOOD SEED TYPES

Entered as Second Class Matter, March 22, 1918, at the Post Office at Harrisburg, Pa., under the Act of June 6, 1900. Acceptance for mailing at special rate of postage provided in section 1103, Act of October 3, 1917, authorized on June 29, 1918.

HARRISBURG, PENNA.
1920.

PENNSYLVANIA POTATOES.

BUSHELS AND DOLLARS.

According to 1919 estimates Pennsylvania potato growers produced 26,000,109 bushels of potatoes on 253,805 acres. They received for these an average price of $1.51 per bushel, or a total of $39,335,063.98.

PENNSYLVANIA'S TEN FOREMOST POTATO COUNTIES.

County	Yield per Acre in Bushels	Total Production in Bushels
Berks,	98	1,125,334
Bradford,	109	705,993
Bucks,	88	766,392
Chester,	74	712,916
Lancaster,	95	1,182,085
Lehigh,	135	2,863,485
Luzerne,	135	784,215
Northampton,	120	746,880
Schuylkill,	119	929,390
York,	100	1,150,000

MORE BUSHELS AND MORE DOLLARS.

The average yield for the whole state is given as *102 bushels per acre.*

This yield is *much too low* considering the wonderful soil and climate of the state.

An average increase of *20 bushels per acre* is an extremely low estimate of what could be brought about by attention to *good seed.*

This increase can be attained *without planting more land, without using more seed,* and *without additional labor.*

Such an increase would add yearly *5,000,000 bushels* to the Pennsylvania potato crop.

These *5,000 000 extra bushels* at 1919 prices would put an additional "velvet" income of *$7,500,000.00* into the pockets of Pennsylvania potato growers.

THE SEED POTATO QUESTION.

By W. A. McCubbin, Deputy Director of Bureau.

The potato is not a seed but is merely the thickened end of an underground branch. As such it is not specially protected against disease as true seeds are and so we find the tuber carrying a considerable number of disease fungi over from one year to the next.

The seed potato question, therefore, is largely a question of potato diseases, and the various movements towards potato improvement have recognized this fact by placing seed certification in the hands of the plant pathologist rather than the horticulturist.

WHAT CONSTITUTES A GOOD SEED POTATO?

In considering the problem of improvement of our seed potatoes, one might very properly ask at the outset, "What ideal or standard shall we adopt for potato seed," for it is always well to have an ideal to strive for even though we seldom attain it completely. A number of features would be included in our definition of an ideal seed potato, the most important of which are given below.

(1) The potato should be of a *standard variety.* Little known varieties lacking popular approval are not ideal, since seed of these sells with difficulty, and can not be bought as readily as well known, popular kinds. Potato associations and seed certification movements recognize this circumstance and confine their work to a few proved and widely accepted varieties.

(2) The seed potato should come from a *high yielding strain.* It should have a past performance to guarantee its claim for yielding qualities. Experienced dairymen purchase new dairy stock only after looking up the milk production of their ancestors, and potato seed should be chosen in the same way. This is absolutely necessary if high yield is looked for, since it has often been shown that twenty different lots of the same variety from as may different fields, when planted side by side will yield in a most erratic manner, some running quite high and others falling far below the average.

(3) Seed should be *uniform in size* and *shapely.* The rule should be here as in stock raising, that one must use for reproduction the sort of tuber one wishes to have in the crop.

(4) A *medium sized tuber* is usually best for seed. The use of large tubers is not economical; and on the other hand the planting of small tubers involves the danger of increasing the proportion of "degenerate" plants in the stock. Since such plants are weakly and tend to produce many small tubers, the use of small tubers for

seed infallibly tends to increase the proportion of degeneracy in next year's crop, because a greater proportion of diseased tubers are planted. Four to eight ounce potatoes are usually regarded as best for seed.

(5) High class seed potatoes should be *dormant* or nearly so. When they have been allowed to sprout in the cellar, and the long white sprouts are then broken off, there is not only a considerable weakening in vitality but the set-back to the buds is very detrimental. This does not refer in any way to the very valuable practice of starting short, green sprouts in the light in a warm place to ensure earliness and higher yield.

(6) Potatoes for seed should be *free from all visible diseases and injuries.* Most of these can be determined by ordinary examination; they should not show bruises, wounds, cracks or wire-worm injury, nor should there be any evidence externally of rots, scabs, wart, or Rhizoctonia. Internally, as shown by taking a slice from the stem end, they should be free from stem end browning, blackleg, and frost and net necrosis.

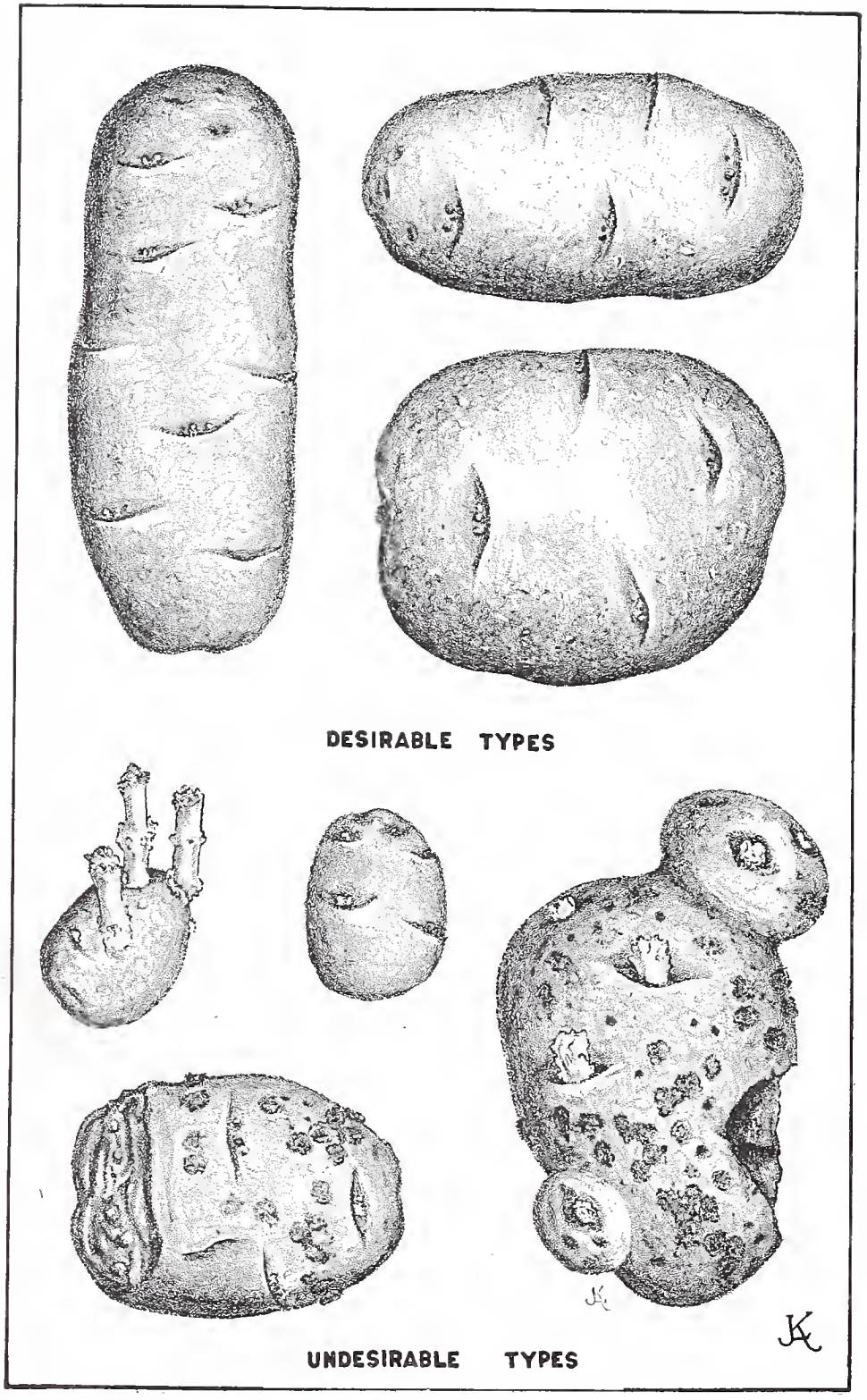
(7) The seed should be *from plants unaffected by Mosaic, Leaf Roll, or Curly Dwarf,* and where the absence of these diseases has not been determined by personal examination of the growing crop at flowering time, the seed should be covered by the certificate of some responsible and competent authority, which has made the necessary examination and can give assurance of freedom from these diseases.

HOW SEED POTATOES MAY BE IMPROVED.

The question may now be asked: "In what ways can the individual potato grower of Pennsylvania improve the quality of his potato seed?" The answer involves a consideration of the various sources of seed; he may, (1) save seed from his own crop; (2) buy from a neighbor or from some other grower who has a dependable supply, (3) go into the open market for his seed, (4) import certified seed either directly or through some dealer.

(1) IMPROVEMENT OF HOME GROWN SEED.

If seed is to be saved from home-grown stock a number of methods may be adopted to improve the quality and thus increase the yield per acre. One of these methods is to choose in the best part of the field a number of rows sufficient to provide a generous seed supply; these rows are then "rogued" about blooming time,—that is, all plants untrue to type and of other varieties are taken out or marked with stakes, as well as all weak, sickly and undersized plants, particularly those having Leaf Roll, Mosaic, or Curly Dwarf, and those affected by Rhizoctonia, Black Leg and Wilt. All hills so marked should be dug as needed for home use, or else taken out just before the rest, thus leaving only healthy, vigorous stock, which is then taken up and stored by itself for next year's seed supply.


DESIRABLE TYPES
UNDESIRABLE TYPES

A second method involves the reverse procedure; instead of the diseased plants and weaklings, there are marked a sufficient number of the best hills to give seed enough for next year, and these are then dug separately and stored for seed. This method is only practicable for comparatively small areas. A modification of it is necessary for large scale potato growing; viz., there are staked a number of the best hills, say 50 to 100, and the product of these is grown in several rows next year, and thus multiplied to give a seed supply for the second year. A still more careful selection may be made by starting with a single hill, the best of a hundred marked in summer, and multiplying it in succeeding years for seed, or even by taking as the starting point a single tuber from the best hill available.

The more careful selections will be more successful in the long run, though the simple "rogueing" mentioned at the outset will usually give very gratifying increases in yield.

The above recommendations are of the highest value in those districts where potatoes grow well naturally. Where the climatic conditions are so adverse that any seed loses vitality and vigor in a few years, these methods can only be used in a very limited way. It should also be said that for success in seed selection along the lines indicated, one should start from a fairly good strain. If the strain grown is not yielding well to start with, or if it has 25% to 40% of weaklings, degenerates and diseased plants, it will usually be far more profitable to discard it and begin with a strain showing more initial promise.

(2) BUYING FROM NEIGHBORING GROWERS.

A great many people get a change of seed from some neighbor or from some other grower in the district whose stock has been well spoken of. In such cases it is more satisfactory to the buyer if he has had an opportunity to see the crop when it was in the field, thus giving him a chance to determine the vigor of the plants and the presence or absence of disease. A summer examination in this way may also enable him to make an intelligent choice between several fields.

(3) SEED FROM THE OPEN MARKET.

Buying seed potatoes in the open market is *a very risky proceeding.* The dealer may be entirely honest and reliable, but even he is often unable to give any adequate guarantee of his stock in many cases. Good seed may be obtained in this way, but one is always taking a chance in buying from an unknown source.

(4) CERTIFIED SEED.

Despite the unsatisfactory features that crop up now and again in the use of certified potato seed brought in from other states, the

stocks so obtainable are generally reliable and so superior in standard that the value of seed certification may be considered as firmly established. Certified seed commands a higher price and ready sale since there is hardly enough to supply the demand, although the amount of it produced is increasing steadily year by year.

SEED CERTIFICATION FOR PENNSYLVANIA.

Pennsylvania has had no seed potato certification system up to the present, and those who wish to use certified seed get it from Maine, New York, and other northern states. The establishment of such a system in this state depends on whether there are potato growing areas of sufficient size to produce the requisite amount of seed of high yielding qualities and free from disease.

In addition to the vital question of freedom from disease, there is also to be considered the effect of climate, since it is well known that after a few years of propagation in hot dry summers, potatoes lose markedly in vitality. The cool moist climate of the northern states seems to be especially favorable to the potato, and this explains to a large extent why seed from the north possesses so much vigor and such high yielding qualities.

There seems every reason to believe that there are considerable areas in Pennsylvania, where the coolness of the high altitudes and the short, moist seasons are so favorable to the needs of the potato, that seed productions would be entirely successful, and if these regions can grow year after year a class of seed potato that can compare favorably with that from the northern states, seed certification for the state would be a most desirable possibility, since it would provide for the potato growers of the state a local supply of seed of guaranteed high standard.

The Bureau of Plant Industry of the Pennsylvania Department of Agriculture has taken up this question, and will take steps to ascertain the possibilities of producing seed stock of sufficiently high standard within the state to warrant the establishment of a seed certification system, and if conditions justify such a system it will be inaugurated.